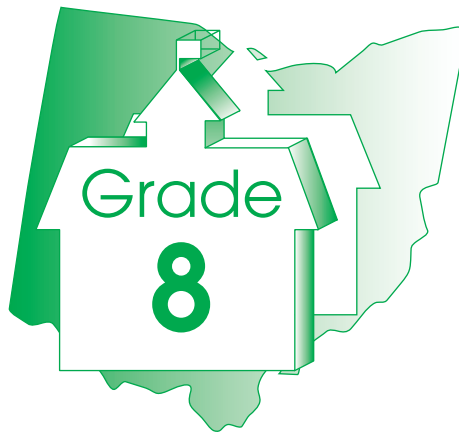


Student Name: \_\_\_\_\_

# Ohio Achievement Assessments



## Mathematics Student Test Booklet Spring 2011

*This test was originally administered to students in Spring 2011.*

*Not all items from the Spring 2011 administration will be released in this document. According to Ohio Revised Code (ORC) 3301.07.11:4(b) . . . not less than forty percent of the questions on the test that are used to compute a student's score shall be a public record. The department (of education) shall determine which questions will be needed for reuse on a future test and those questions shall not be public records and shall be redacted from the test prior to its release as public record.*

*This publicly released material is appropriate for use by Ohio teachers in instructional settings. This test is aligned with Ohio's Academic Content Standards for Mathematics.*

The Ohio Department of Education does not discriminate on the basis of race, color, national origin, sex, religion, age, or disability in employment or the provision of services.

The Ohio Department of Education acknowledges that copyrighted material may contain information that is not currently accurate and assumes no responsibility for material reproduced in this document that reflects such inaccuracies.

## Ohio Grade 8 Mathematics Achievement Assessment Reference Sheet

Information that may be needed to solve problems on the Mathematics Test:

### Area Formulas

parallelogram  $A = bh$

rectangle  $A = lw$

trapezoid  $A = \frac{1}{2} h (b_1 + b_2)$

triangle  $A = \frac{1}{2} bh$

### Circle Formulas

$C = 2\pi r$   
 $A = \pi r^2$

$\pi \approx 3.14$  or  $\frac{22}{7}$

### Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

### Volume Formulas

cone  $V = \frac{1}{3} \pi r^2 h$

cylinder  $V = \pi r^2 h$

pyramid  $V = \frac{1}{3} Bh$   
( $B$  = area of base)

rectangular  
prism  $V = lwh$

right prism  $V = Bh$   
( $B$  = area of base)

sphere  $V = \frac{4}{3} \pi r^3$

**Directions:**

Today you will be taking the Ohio Grade 8 Mathematics Achievement Assessment. Three different types of questions appear on this test: multiple choice, short answer and extended response.

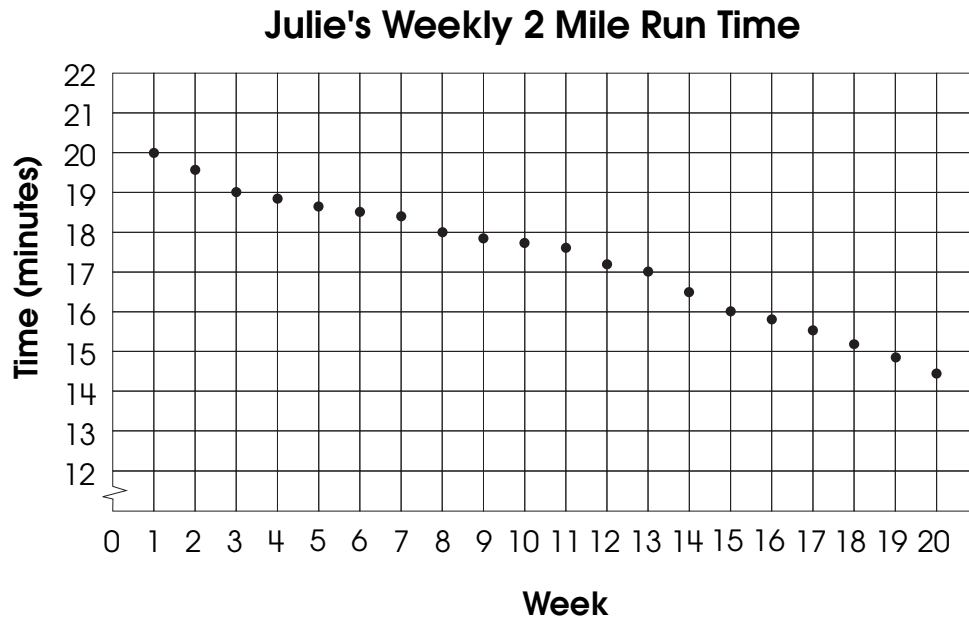
There are several important things to remember:

1. Read each question carefully. Think about what is being asked. Look carefully at graphs or diagrams because they will help you understand the question. Then, choose or write the answer you think is best.
2. Use only a #2 pencil to answer questions on this test. You may use a calculator on this test.
3. Refer to the Mathematics Reference Sheet in your Student Test Booklet for mathematical formulas and expressions. You may remove this page from your Student Test Booklet.
4. For multiple-choice questions, fill in the circle next to your answer choice. Mark only one answer for each question. If you change your answer, make sure you erase your old answer completely. Do not cross out or make any marks on the other choices.
5. For constructed-response questions, write your answer neatly, clearly and only in the space provided in your Answer Document. Any responses written in your Student Test Booklet will not be scored.
6. Short-answer questions are worth two points. Extended-response questions are worth four points. Point values are printed near each question in your Student Test Booklet. The amount of space provided for your answers is the same for all two- and four-point questions.
7. You may use the blank areas of your Student Test Booklet or the optional grid paper in your Answer Document to work out and solve problems. Do not tear out the optional grid paper from your Answer Document.
8. If you do not know the answer to a question, skip it and go on to the next question. If you have time, go back to the questions you skipped and try to answer them before turning in your Student Test Booklet and Answer Document.
9. Check over your work when you are finished.
10. When you finish this section of the test, you may **NOT** go back to the reading section or go on to the science section in the Student Test Booklet.

Item 1 has not been slated for public release in 2011.



2. Each Friday, Julie's track club runs two miles. The graph shows the amount of time that it takes Julie to run the 2 miles each week over a period of 20 weeks.



Which describes the relationship between the number of weeks Julie practices and her running time?

- A. Julie is running at a slower rate each week.
- B. Julie decreases her time by about 20 seconds each week.
- C. Julie decreases her time by about one minute each week.
- D. Julie is likely to run the 2 miles in 12 minutes during the 21st week.

3. Which value for  $x$  makes the inequality  $-4x - 5 > 11$  true?

- A.  $x = -6$
- B.  $x = -4$
- C.  $x = 4$
- D.  $x = 6$



4. The president of a company is comparing employees' ages in two departments: design and sales. The stem-and-leaf plots show the ages of the employees in each department.

**Design  
Department**

2	2 6 8 8 8
3	6 8 8 9
4	1 6
5	
6	

**Sales  
Department**

2	8
3	0 2 5 7 7
4	5
5	0 2
6	0

Key

$$2|7 = 27$$

Which statement is true about the median and the mode of employees' ages in each department?

- A. The median and the mode of the employees' ages in the design department are both greater than in the sales department.
- B. The median and the mode of the employees' ages in the sales department are both greater than in the design department.
- C. The median of the employees' ages is greater in the design department, but the mode of the employees' ages is greater in the sales department.
- D. The median of the employees' ages is greater in the sales department, but the mode of the employees' ages is greater in the design department.



Item 5 has not been slated for public release in 2011.

6. A contractor is installing a new concrete sidewalk. The sidewalk will be 580 feet long,  $9\frac{1}{2}$  feet wide and 6 inches deep.

Trucks will deliver 10 cubic yards of concrete in each truckload.

In your **Answer Document**, determine how many truckloads of concrete the contractor will need to order. Show or explain all steps you used to determine the number of truckloads needed.

For question 6, respond completely in your **Answer Document**. (2 points)



Items 7–10 have not been slated for public release in 2011.

11. In 2000, the population of the United States was about  $2.9 \times 10^8$ . The land area of the United States is about 3,500,000 square miles.

In your **Answer Document**, find the average number of people per square mile in the United States in 2000. Show or explain how you found the average.

For question 11, respond completely in your **Answer Document**. (2 points)



On the Spring 2011 Grade 8 Mathematics Achievement Assessment, items 12–17 are field-test items, which are not released.



18. Laura is analyzing the percentage of her income she spends on food, clothing and housing.

Which is the most appropriate graph to represent this information?

- A. circle graph
- B. histogram
- C. line graph
- D. scatterplot

Item 19 has not been slated for public release in 2011.

20. The boat from Scotland to Ireland takes 2.5 hours and travels a distance of 75 miles.

The distance from Scotland to Norway is 600 miles.

About how many hours will it take for the boat to go from Scotland to Norway if it travels at the same speed?

- A. 3 hours
- B. 8 hours
- C. 20 hours
- D. 30 hours



21. The brochure from Store-It-Yourself Storage shows the monthly cost for storage units.

Store-It-Yourself	
Unit Size	Cost Per Month
25 Sq Ft	\$22.25
50 Sq Ft	\$44.50
75 Sq Ft	\$66.75
100 Sq Ft	\$89.00

For question 21,  
respond completely  
in your **Answer  
Document**. (4 points)

In your **Answer Document**, create a line graph that shows the relationship between unit size and cost per month.

Write an equation that can be used to determine the per-square-foot cost of a storage unit with any number of square feet. Show or explain how you found your equation.

Then, use your equation to determine how much it will cost Tom to rent a 10-by-12-foot storage unit from Store-It-Yourself Storage. Show or explain your work.

Items 22–24 have not been slated for public release  
in 2011.

25. Which describes the  $\sqrt{27}$ ?

- A. a little more than 4
- B. a little less than 5
- C. a little more than 5
- D. a little less than 6



Items 26–30 have not been slated for public release in 2011.

31. An auditorium has 5 sections of seats. Each section has between 190 and 210 seats. At a concert, 75% of the seats were occupied.

In your **Answer Document**, estimate the number of occupied seats at the concert. Show or explain your estimation strategy.

For question 31, respond completely in your **Answer Document**. (2 points)



32. Jason has 50 gallons of water in his bathtub. The bathtub drains at 4 gallons per minute.

Which equation can Jason use to find the total amount of water,  $w$ , left in the bathtub after  $t$  minutes?

- A.  $w = 4 + 50t$
- B.  $w = 4 - 50t$
- C.  $w = 50 - 4t$
- D.  $w = 50 + 4t$





Items 33–35 have not been slated for public release in 2011.

36. The table shows the batting averages for the Sousa Middle School baseball team.

Position	Batting Avg.
Pitcher	.150
Catcher	.230
1st Base	.280
2nd Base	.225
Short Stop	.250
3rd Base	.200
Left Field	.290
Center Field	.300
Right Field	.270

For question 36, respond completely in your **Answer Document**. (2 points)

In your **Answer Document**, create a box-and-whisker plot to represent the data in the table. Be sure to identify the median, the lower and upper quartiles, and the lower and upper extremes.

Item 37 has not been slated for public release in 2011.

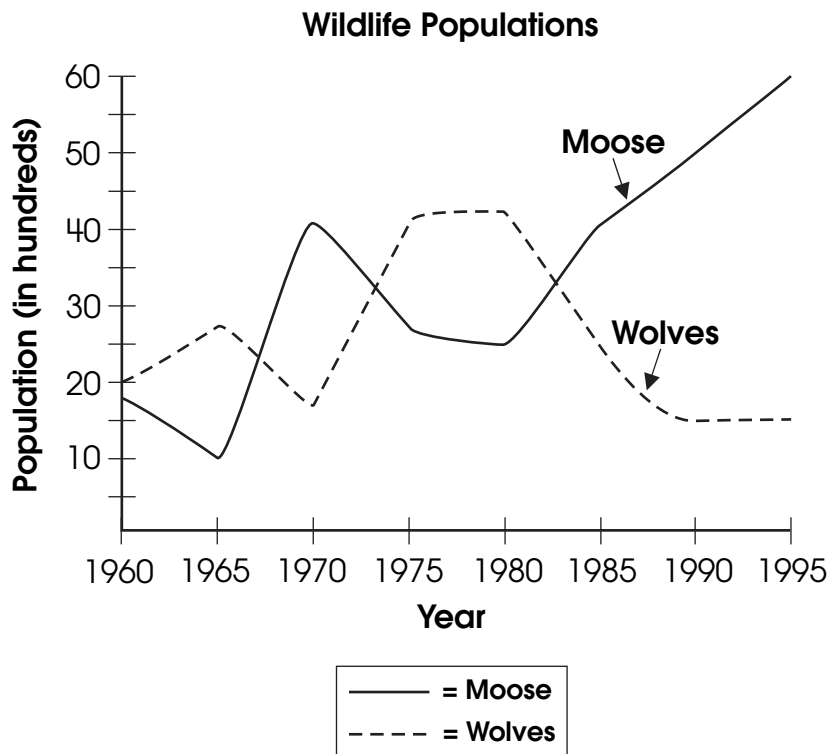
38. For a science project, Nick found that the width of a human hair is about  $1.1 \times 10^{-3}$  inches.

What is this width written in standard form?

- A. 0.000011 inches
- B. 0.00011 inches
- C. 0.0011 inches
- D. 0.011 inches



39. The graph shows wolf and moose populations in a certain region over a 35-year span.



Which conclusion can be drawn from the data shown in the graph?

- A. When the wolf population is low, the moose population is low.
- B. When the wolf population is high, the moose population is high.
- C. When the wolf population is increasing, the moose population is decreasing.
- D. When the wolf population is decreasing, the moose population is decreasing.

Items 40–42 have not been slated for public release in 2011.

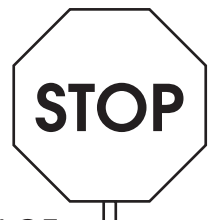
43. Which data set represents continuous data?

- A. Mary's weekly quiz scores for a period of 8 weeks
- B. the distance a plane travels at a rate of 500 mph
- C. the number of pencils brought to school by 10 students
- D. John's monthly income for a period of 10 months

44. Two vertices of a triangle are located at  $(-2, 1)$  and  $(1, 1)$ .

Which ordered pair would make a right triangle when used as the third vertex?

- A.  $(0, -2)$
- B.  $(0, 4)$
- C.  $(-2, -4)$
- D.  $(-3, 5)$



M